printips

spotlight: Printing Paper and the Environment

As printers, we have a special relationship to paper. Far more than appreciating its beauty, we understand its physical properties so we know how it will react to a specific set of production conditions. We know the latest trends in colors and finishes and whether new papers are being manufactured in response to new printing devices. We know the price of paper, and whether it is scarce or readily available.

Because paper is so integral to what we do, many of us learn its history and manufacturing process. And lately we've also been learning about paper's impact on the environment.

A BRIEF HISTORY OF PAPER

The word paper is from the Latin word papyrus, the Nile Delta plant from which Egyptians made their writing material. Known as a wetland sedge, papyrus-based writing material was abundant but fragile and susceptible to damage. It gradually gave way to parchment, a writing material made from animal hides.

What we know today as paper – writing material made of pulp, rags, and plant fibers – was invented by the Chinese almost 2000 years ago. The plant material they used was bark, primarily from the paper mulberry tree. (Today's paper is made from the tree's wood fibers which are more plentiful than bark but require more processing.)

For thousands of years after its invention, paper was made by hand and relied heavily on rags as the main fiber ingredient. It wasn't until the 19th century that steam-driven papermaking machines were developed and wood became the main source of fiber.

HOW PAPER IS MADE

The basic process of making paper is the same, whether done by hand or with machinery: the material containing the wood or plant fibers is soaked in liquid to separate the individual fibers; a screen is passed through the slurry to catch and orient the fibers; the liquid is removed from the fibers on the screen through pressing and drying; and the formed sheets are removed from the screen.

Today the two main sources of cellulose fiber for paper is wood pulp (a dry fibrous material made by separating fibers from wood); recycled paper;

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and vegetable fiber such as cotton and cereal crops such as straw. Wood pulp comes from both softwood trees (spruce, pine, fir, larch, hemlock) and hardwood trees (eucalyptus, aspen, birch) which are grown in pulpwood forests specifically for paper making. Thus paper is a natural, renewable resource that is biodegradable, recyclable, and a source of energy after use.

THE ECOLOGY OF PULPWOOD FORESTS

There was a time in the past when pulpwood came from cutting mature forests. Today pulpwood comes from the parts of a tree (such as wood chips and sawdust) that are left after using the tree for other commercial purposes; from thinning a forest of trees; or from forests grown solely for paper making. In addition, several certifying bodies have become active to encourage sustainable forestry initiatives for trees used for paper as well as other products such as furniture or construction.

Like all forests, pulpwood forests act as a "sink" for carbon dioxide because they take in more carbon dioxide from the atmosphere as part of the photosynthesis process than they give up through respiration and decomposition. And the younger the forest, the greater amount of carbon dioxide is sequestered in the trees.

THE ROLE OF WATER IN PAPER MAKING

Because it is used in almost every stage of the pulping and paper making process, water is an important part of the paper manufacturing process. Almost all early paper mills were located next to rivers to ensure a dependable source of water.

Unfortunately, early mills contributed to water pollution by discharging waste water contaminated by solid matter, nitrogen, phosphorus and organic substances back into the rivers. In response to stricter environmental controls, paper mills now recycle water and collect contaminated water for treatment prior to being returned to its source.

ENERGY USED FOR PAPER MAKING

Manufacturing paper is energy intensive. In fact, up to 25% of the total manufacturing cost can be attributed to energy consumption, providing an economic incentive for paper mills to practice energy efficiency.

Modern paper making plants produce biomass fuels as a by-product of the manufacturing process, which in turn are used as a source of energy during manufacturing. (Biomass is organic material made from plants and animals and contains stored energy from the sun. Some examples of biomass fuels are wood, crops, manure, and some garbage.) Since the most common form of biomass is wood, many paper mills use wood waste to produce the energy needed to power their operations. In fact, the pulp and paper industry is the single largest producer and user of biomass fuels.

RECYCLED PAPER

About 30% of the raw material for making paper today is paper that has been recovered during recycling, called post consumer waste. Paper mills have always recycled scraps, called mill broke, which is pre consumer waste and so doesn't really count as recycled paper.

Not all paper that has been collected for recycling can be used in all paper grades. Every time a paper fiber is recycled, it loses some of its length, and therefore some of its strength. So recovered paper must be mixed with some virgin fibers, and cannot be used indefinitely. Some recovered paper must be deinked before it can be reused. The first step in using recovered paper is to sort it according to grade:

- Low grades consisting of mixed papers, old corrugated containers, board, etc.) are used to produce packaging papers and boards. Most recovered paper is used in low grade applications.
- Deinking grades such as newspapers and magazines are also considered to be low grades and are used for graphics and sanitary papers.
- High grades consisting of mill broke and other scrap can be used as a pulp substitute.

After the recovered paper is sorted and graded, it is delivered to a paper mill where it is made into pulp. Contaminants such as staples, plastic and glass are removed, then the fibers progressively cleaned and the pulp is filtered and screened.

PAPER AND THE CARBON CYCLE

As a forest product, paper is part of a carbon cycle that begins with photosynthesis and produces a biomass fuel as a by-product. After use, many paper products can be collected and recovered, to be re-used as a raw material to make more paper or paper products.

idea corner: What About Watermarks?

To add an elegant touch to your business letterheads, consider using a water marked paper. A watermark is a translucent image that is added to the fibers of paper during the papermaking process. Hold a fine writing paper such those made by Crane's or Strathmore up to the light and you'll see the watermark clearly.

Besides beauty, a watermark also provides a security feature. Since genuine watermarked paper cannot be duplicated, documents printed on it are protected by the watermark. For example, when United States currency was redesigned in 1995, a watermark of Benjamin Franklin was added to the $100 bill.

A genuine watermark is made while paper is still wet and moving through the wire portion of the Fourdrinier papermaking machine. The pulp or stock passes under a cylinder called a dandy roll on which the watermark design is located. The watermark design displaces the fibers, which alters the thickness and opacity of the paper in those areas. It is the variation in opacity that is seen as the watermark. There are three positions for a watermark:

- **Localized:** the mark falls in the same position on every sheet (within a tolerance of one-half inch)
- **Centralized:** the mark appears in the same vertical line on the sheet, though its top-to-bottom location may vary
- **Random:** the watermark falls anywhere on the sheet. In this instance, the watermark may appear more than once on a single sheet.

One confusing aspect of paper is its basis or substance weight, the number that refers to the weight of a ream of paper (500 sheets) in its parent size (i.e., the size the sheet was originally made in). Each category of paper has a different parent size, ranging from 17 x 22 inches for bond papers, to 23 x 35 inches for writing papers, and 25 x 38 inches for text papers. For bond papers, a ream in the parent size weighs 20#, while a ream of writing paper weighs 24# and text paper weighs 70#. Moreover, the basis weight isn't a particularly useful thing to know since most often what you are interested in is the thickness of the paper, and that is not defined by the basis or substance weight. To compare thicknesses, you must know the micrometer measurement of the paper.

But don't worry too much about basis weight and micrometer measurement — we can guide you through paper selection and provide sample sheets for you to inspect.

graphics tip: Leave Photoshop for Photos

Adobe Photoshop is an amazingly powerful graphics application that is part of any designer's software repertoire. With 11 versions in just over 20 years, Adobe continues to innovate and extend Photoshop's capabilities.

However, at its core, Photoshop remains a pixel-based image editor. While it's the ideal program to retouch photographs and edit scanned artwork, Photoshop has never been intended to serve as a layout & design application. Consequently, using Photoshop to render text, particularly at small sizes, can potentially produce undesirable results.

To achieve the best quality possible, we recommend using a layout & design application such as Adobe InDesign, QuarkXpress, or Microsoft Publisher because these programs render text as vector artwork (mathematical formulas) rather than pixels (squares). Layout & design software also provides a more intuitive interface to control type flow and placement. You can also import your Photoshop graphics and add other visual elements to enhance the overall design.

If you have any questions, or need help using your layout & design application, call (609) 387-0030.

marketing focus: Fixing Marketing Disasters

Using What, Why, and How to make your marketing more effective.

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In a previous article I wrote about measuring the effectiveness of your marketing. In thinking about this further it seemed a good idea to talk about what to do after you measure the effectiveness and realize that something didn't work. Here are 5 simple steps to figure out why something didn't work and how to improve it.

1. **ANALYZE THE SITUATION.** This phase could be called the What Phase. Not everything is a total failure so look at all the components. Figure out what worked and what didn't. Then look at the concerns and qualify them from the most important to the least important. Now you have the order of what needs to be worked on. If you are working with a team, or other people, analyze the problem together. If you work alone, it is not a bad idea to use your network and see if they can help you. Sometimes it is a good idea to have more than one set of eyes do an analysis.

2. **ANALYZE THE ISSUES.** Now you are in the Why Phase. It is one thing to know what went wrong, but it is more important to figure out why so it can be corrected. Note that this is not the *"Who Phase"*. It is not a time to point fingers or assign blame. You simply want answers, such as, we had poor mailing response because the design of the mailer was too cumbersome and difficult to find the message. Or the e-mailed offer was not suitable for that media. Attack each issue from the most important to the least and look for patterns. It is not important to fix things now. That comes later. Now all you need to do is identify why particular aspects went wrong.

3. **FIND THE SOLUTIONS.** This is the beginning of the How Phase. Now that you know what went wrong and why, it becomes possible to find the solution. As with everything else in life, there is probably more than one solution. Using your team, your network and whatever other resources you have available, figure out the best solution. Use the same step by step approach recommended in part 1 and 2. But now also take a look again as to what was right and incorporate the successes into the solution. For instance, say an ad didn't work and you figured out that it was placed in the right publications, but the offer was not strong enough to make the customer respond. Take the good and the bad and find the solution. Running the same ad in different publications is probably not the right solution.

4. **IMPLEMENTATION OF THE SOLUTIONS.** This is the rest of the How Phase. How do we implement the solutions that you came up with in item 3. The key here is planning, responsibility and setting a realistic expectation of how the solution will work. One thing that could have gone wrong in the first place is that the expectations may have been too high.

5. **ANALYZE THE SITUATION.** You may be thinking I already said this. I did, but now we have to start all over again. Analysis is very important all the time. Not only do you need to analyze how well the solutions worked, but how well they were implemented. Was it done according to the new plan or did something not go right. If it didn't, WHAT happened, WHY did it happen, HOW can we fix it? You get the picture?

This little five-step program is not limited to just marketing issues. This kind of detailed analysis and solution finding can be applied to just about any situation. In putting this article together, I referred to more management resources than I did marketing resources.

For more information feel free to give me a call at **609-387-0030** or you can e-mail me at **rich@burlingtonpress.com**.

green concepts

Burlington Press is committed to doing our part to conserve, reuse, recycle and be responsible for the paper we purchase and use in your printing projects. Here are some of the ways we carry out that responsibility:

- We train our press operators to minimize the use of paper. Each printing job requires make-ready – an amount of paper going through the press to get the image in the correct location on the sheet, to register the parts of the image, and get up to color. When possible, our press operators use scrap paper that would otherwise be discarded. We have set standards for the amount of extra sheets to print to allow for post-press operations. And we have sheet counters on our presses so we aren't guessing about how much paper has been printed.

- We encourage you to use the paper we stock as house sheets. When you let us use our house sheet for your job instead of a special-order paper, you keep us from having to order more than we need for the job. We must purchase paper in minimum quantities, sometimes as many as 4000 or 5000-sheet cartons. If your job needs 1235 sheets and you are using a house sheet, we will use 1235 sheets. If we must order, the job will require the minimum paper quantity.

- We donate our surplus paper. After completing a printing job, we re-package any leftover paper to protect it. Then we store it until enough has accumulated to donate to schools, churches, or charities. If you would like to be added to our distribution list, call 609-387-0030 or e-mail experts@burlingtonpress.com.

print lingo: Vocabulary of the Trade

ACIDITY: Degree of acid found in a given paper, as measured by pH factor.

BASIS WEIGHT: the weight in pounds of a ream (500 sheets) of paper in its basic (or parent) size. Also called substance weight.

BEAT TO A PULP: the first step in making paper out of cotton. The cotton fibers and water are beaten to a pulp in a Hollander beater.

BULK: thickness of a sheet of paper in relation to its weight. High bulk paper lacks compactness; low bulk paper is compact.

CAST OF COATING: coated paper pressed against a solid, highly polished chrome surface while the coating is in a plastic condition, thereby casting the coated surface.

COATING: substances applied to a finished sheet of paper to protect it or make it shiny.

DE-INKING: the process of extracting the ink and coatings from printed papers so that the fibers can be used again as a secondary fiber source.

EFFLUENT: the liquid discharge or waste products of the papermaking process. Often includes a small amount of suspended solids and dissolved chemicals. Because most modern paper mills now contain wastewater treatment plans, effluent now can be discharged into rivers.

FOURDRINIER PAPER MACHINE: a papermaking machine invented by a Frenchman, Nicolas Louis Robert in 1798, developed in England by Brian Donkin for Henry and Sealy Fourdrinier, but not placed into operation until 1804. The Fourdrinier Paper Machine was the first papermaking machine to make continuous paper. Prior to this machine, paper was made in single separate sheets.

MOISTURE CONTENT: the amount of moisture in a sheet of paper. Usually ranges from 5-8%. Paper emits or absorbs moisture from its environment. Moisture loss is seen at the edge of the paper in the form of curl.

OPACITY: the degree to which a sheet of paper will transmit light or show through dark printing.

OPTICAL BRIGHTNESS: the degree to which a sheet appears to be very bright white. Optical brighteners or fluorescent dyes are added to the paper, which absorbs invisible ultraviolet light, converts it to visible light. This falls in the blue to violet portion of the light spectrum, which is then reflected back.

SECONDARY PAPER: any recycled fibers, waste papers, or other sources of pulp and fiber that come from a previously created product or process.

VIRGIN FIBER: wood fiber that has never been recycled.